

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
29 December 2004 (29.12.2004)

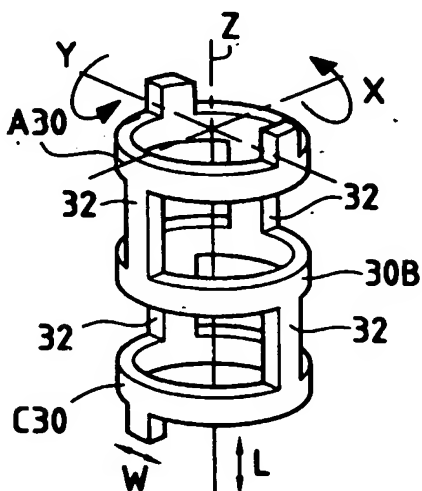
PCT

(10) International Publication Number  
**WO 2004/113667 A1**

- (51) International Patent Classification<sup>7</sup>: **E21B 7/20**
- (21) International Application Number:  
PCT/EP2004/006182
- (22) International Filing Date: 7 June 2004 (07.06.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
0314533.1 23 June 2003 (23.06.2003) GB
- (71) Applicant (for FR only): SERVICES PETROLIERS SCHLUMBERGER [FR/FR]; 42, rue Saint Dominique, F-75007 Paris (FR).
- (71) Applicant (for AT, AU, AZ, CO, DE, DK, HR, ID, IE, IT, KP, KR, KZ, MX, NO, NZ, PH, PL, RO, RU, SK, ZA only): SCHLUMBERGER TECHNOLOGY B.V. [NL/NL]; Parkstraat 83-89, NL-2514 JG The Hague (NL).
- (71) Applicant (for all designated States except AE, AT, AU, AZ, BR, CA, CG, CM, CN, CO, CZ, DE, DK, DZ, EC, EG, FR, GA, GQ, HR, ID, IE, IN, IT, KP, KR, KZ, LT, MA, MX, NA, NE, NO, NZ, OM, PG, PH, PL, RO, RU, SD, SK, SY, TD, TN, TR, TT, US, VN, ZA): SCHLUMBERGER HOLDINGS LIMITED; P.O. Box 71, Craigmuir Chambers, Road Town, Tortola (VG).
- (71) Applicant (for CA only): SCHLUMBERGER CANADA LIMITED [CA/CA]; 525 - 3rd Avenue S.W., Calgary, Alberta T2P 0G4 (CA).
- (71) Applicant (for CN only): SCHLUMBERGER OVERSEAS S.A. [PA/PA]; 8 Calle Aquilino de la Guardia, Panama City (PA).
- (71) Applicant (for AE, OM, SD, SY, TR only): SCHLUMBERGER OILFIELD ASSISTANCE LIMITED; Craigmuir Chambers, Road Town, Tortola (VG).
- (71) Applicant (for BR only): SCHLUMBERGER SURENCO S.A. [PA/PA]; 8 Calle Aquilino de la Guardia, Panama City (PA).
- (71) Applicant (for TT only): SCHLUMBERGER SERVICES LIMITED; P.O. Box 438, Tortola (VG).
- (71) Applicant (for EG only): SCHLUMBERGER SEACO INC. [PA/PA]; 8 Calle Aquilino de la Guardia, Panama City (PA).
- (71) Applicant (for CG, CM, CZ, DZ, EC, GA, GQ, IN, LT, MA, NA, NE, PG, TD, TN, VN only): PETROLEUM RESEARCH AND DEVELOPMENT NV [NL/NL]; De Ruyterkade 62, Willemstad, Curacao (AN).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): ORBAN, Jacques [FR/FR]; 12, rue des Quatre Vents, F-92380 Garches (FR).
- (74) Agent: ETUDES & PRODUCTIONS SCHLUMBERGER; 1, rue Henri Becquerel - BP 202, 92142 Clamart Cedex (FR).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,

[Continued on next page]

(54) Title: FLEXIBLE DRILL STRING MEMBER



(57) Abstract: A drilling tool that has a flexible shaft so as to be able to make short radius curves while still being able to transmit torque and axial loads. The drilling tool includes a drill shaft for transmitting axial load, comprising a series of coaxial ring members connected together such that adjacent ring members are flexible in an axial plane relative to each other; each ring member being connected to an adjacent ring member by connecting member arranged to transmit torque therebetween; and axial supports extend between adjacent ring members so as to transmit axial loads therebetween.



CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.